

# SE MRC College Algebra Content Review

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## Logarithmic Functions Section 4.2

**(Don't forget to look for the logarithmic properties handout.)**

### Learning Objectives:

1. Change from logarithmic to exponential form.
2. Change from exponential to logarithmic form.
3. Evaluate logarithms.
4. Use basic logarithmic properties.
5. Graph logarithmic functions.
6. Find the domain of a logarithmic function.
7. Use common logarithms.
8. Use natural logarithms.

3. Write the equation in its equivalent logarithmic form.

$$8^4 = 4096$$

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1. Write the equation in its equivalent exponential form.

$$4 = \log_9 6561$$

4. Write the equation in its logarithmic form.

$$z^7 = 601$$

2. Write the following equation in its equivalent exponential form.

$$2 = \log_b 9$$

5. Write the equation in its equivalent logarithmic form.

$$9^z = 99$$

6. Find the exact value of the logarithm without using a calculator.

$$\log_5 25$$

9. Evaluate the following expression without using a calculator.

$$\log_{64} 2$$

7. Evaluate the expression without using a calculator.

$$\log_7 \frac{1}{7}$$

10. Evaluate the following expression without using a calculator.

$$\log_7 7$$

8. Evaluate the following expression without using a calculator.

$$\log_3(\sqrt{3})$$

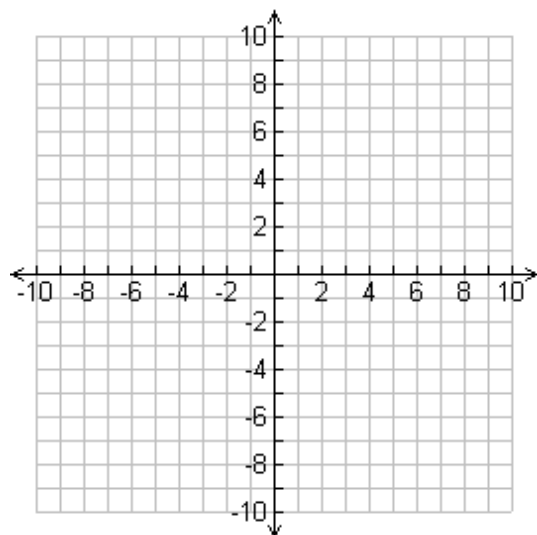
11. Evaluate the following expression without using a calculator.

$$\log_4 4^7$$

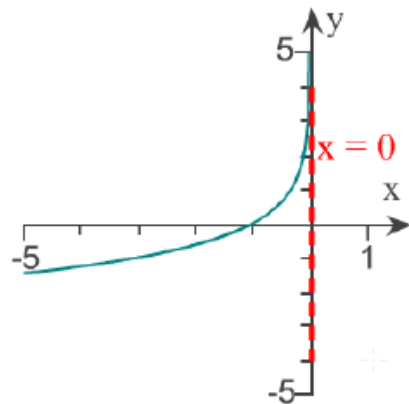
12. Evaluate the following expression without using a calculator.

$$6^{\log_6 7}$$

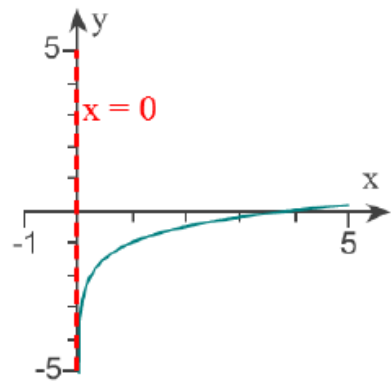
13. Graph  $f(x) = 4^x$  and  $g(x) = \log_4 x$  in the same rectangular coordinate system.



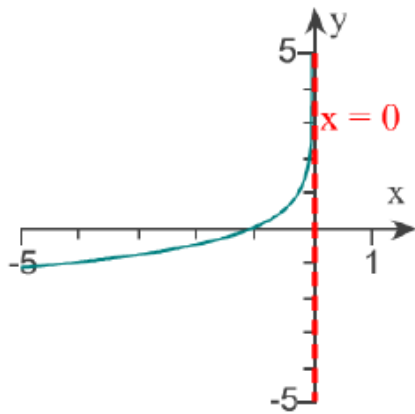
14. The graph of the logarithmic function is given. Write a function for the graph.



15. The graph of the logarithmic function is given. Write a function for the graph.

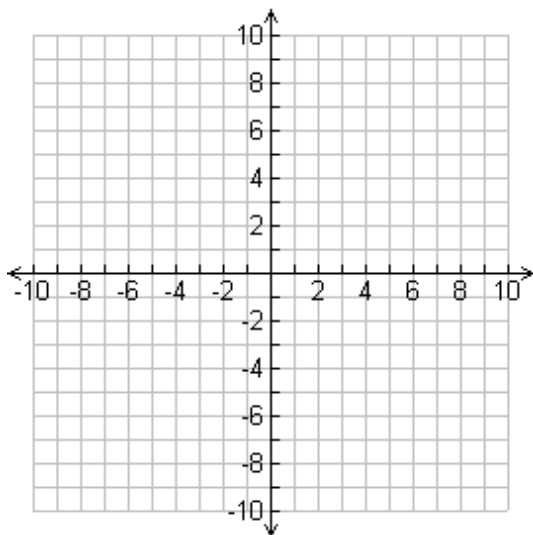


16. The graph of the logarithmic function is given.  
Write a function for the graph.



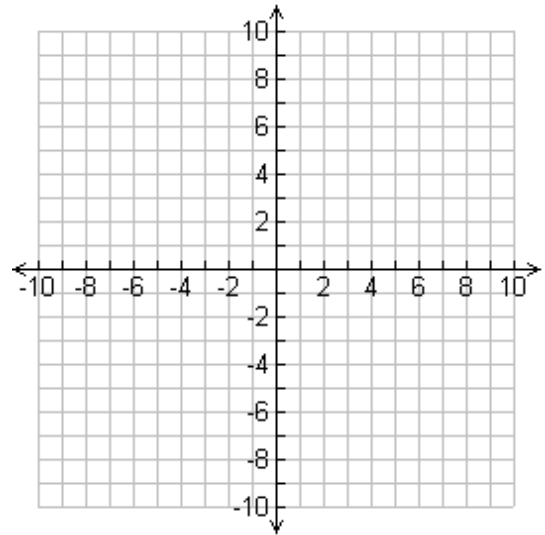
17. Begin by graphing  $g(x) = \log_4 x$ . Then use transformations of this graph to graph the given function. What is the vertical asymptote? Use the graphs to determine the given function's domain and range.

$$g(x) = \log_4(x + 2)$$



18. Begin by graphing  $g(x) = \log x$ . Then use transformations of this graph to graph the given function. What is the vertical asymptote? Use the graphs to determine the given function's domain and range.

$$g(x) = \log x - 3$$



19. Find the domain of the function.

$$g(x) = \log_3(x - 4)$$

20. Evaluate the expression without using a calculator.

$$\log 10$$

21. Evaluate the expression without using a calculator.

$$10^{\log 21}$$

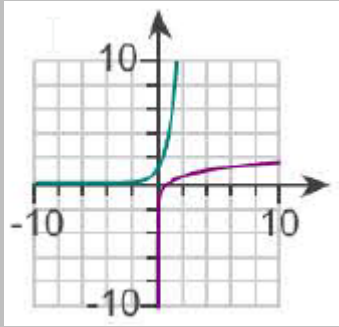
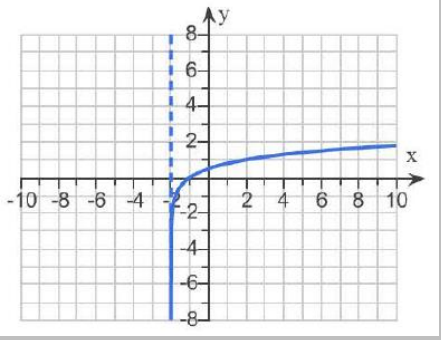
22. Evaluate the expression without using a calculator.

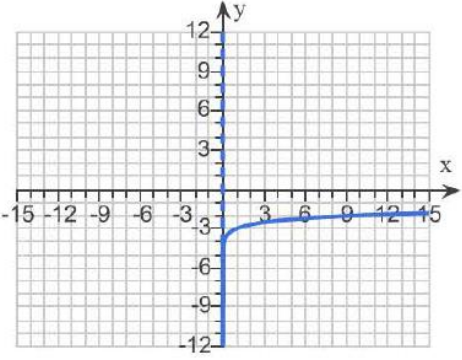
$$\ln e^7$$

23. Evaluate the expression without using a calculator.

$$e^{\ln 110}$$

**Answer Key:**

|                     |   |                     |          |         |                |        |                     |
|---------------------|---|---------------------|----------|---------|----------------|--------|---------------------|
| 1.                  | $9^4 = 6561$  |                     |          |         |                |        |                     |
| 2.                  | $b^2 = 9$   |                     |          |         |                |        |                     |
| 3.                  | $4 = \log_8 4096$   |                     |          |         |                |        |                     |
| 4.                  | $7 = \log_z 601$  |                     |          |         |                |        |                     |
| 5.                  | $\log_9 99 = z$   |                     |          |         |                |        |                     |
| 6.                  | 2   |                     |          |         |                |        |                     |
| 7.                  | -1  |                     |          |         |                |        |                     |
| 8.                  | $\frac{1}{2}$   |                     |          |         |                |        |                     |
| 9.                  | $\frac{1}{6}$   |                     |          |         |                |        |                     |
| 10.                 | 1   |                     |          |         |                |        |                     |
| 11.                 | 7   |                     |          |         |                |        |                     |
| 12.                 | 7   |                     |          |         |                |        |                     |
| 13.                 |   |                     |          |         |                |        |                     |
| 14.                 | $y = -\log_3(-x)$   |                     |          |         |                |        |                     |
| 15.                 | $y = \log_4 x - 1$  |                     |          |         |                |        |                     |
| 16.                 | $y = -\log_4(-x)$   |                     |          |         |                |        |                     |
| 17.                 |  <table border="1"> <tr> <td>Vertical Asymptote:</td><td><math>x = -2</math></td></tr> <tr> <td>Domain:</td><td><math>(-2, \infty)</math></td></tr> <tr> <td>Range:</td><td><math>(-\infty, \infty)</math></td></tr> </table> | Vertical Asymptote: | $x = -2$ | Domain: | $(-2, \infty)$ | Range: | $(-\infty, \infty)$ |
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| Domain:             | $(-2, \infty)$  |                     |          |         |                |        |                     |
| Range:              | $(-\infty, \infty)$   |                     |          |         |                |        |                     |

|     |   |                     |
|-----|---|---------------------|
| 18. |  |                     |
|     | Vertical Asymptote:   | $x = 0$             |
|     | Domain:   | $(0, \infty)$       |
|     | Range   | $(-\infty, \infty)$ |
| 19. | $(-4, \infty)$  |                     |
| 20. | 1   |                     |
| 21. | 21  |                     |
| 22. | 7   |                     |
| 23. | 110   |                     |